

engineering (Elektrotechnik). In a work dealing with such a subject, we should have thought the publishers would not have departed from the very sensible plan, adopted in practically all good German scientific books, of printing in the ordinary Roman type instead of in the German script. We can safely assert that the adoption of the German character will very considerably reduce the number of foreign readers.

The book is divided into two parts, the first containing chapters on the mechanical, magnetic, electrostatic and electromagnetic units, and a comparison of these two latter systems.

The second part, taking up three-quarters of the book, is entitled "Additions and Explanations" (Zusätze und Erläuterungen), and consists of a somewhat curious collection of all kinds of information and numerical examples, and we are afraid that the reader who uses the book as an introduction to the study of electrical engineering will not profit very much thereby. We think, in fact, that the two objects of the book are incompatible, as it is hardly reasonable to expect a person just beginning to study electrotechnics to grasp such conceptions as the relations of the electromagnetic and electrostatic systems of electrical units, and so forth, or to go from chapter ii. of the second part, on the calculation of dynamos and considerations of the thickness of the insulation on double cotton-covered wires, &c., to chapter iii., introducing, without a word of warning, highly involved considerations of potential theory with differential equations half a page long.

The book will be mainly useful to teachers in technical colleges and schools, who are often called upon for the satisfaction of inquiring students to work out a formula from first principles, a subject with which the practical man has neither the time nor the inclination to bother. Such a teacher would find it useful to have this book by him, and the many references and footnotes given would be additionally helpful in such cases.

In fact, the book appears to us like a collection of notes of theoretical considerations and blackboard examples acquired by a lecturer to assist him in his lectures, and as such will no doubt have its sphere of usefulness.

If we may permit ourselves one more remark, in paragraph 92, on "hydroelectric chains," examples are worked out at length on the calculation of electromotive force according to the old "Thomson" law (equivalence of heat of reaction and electrical current work), and the only warning given that this assumption is both fundamentally wrong and in many cases leads to totally false results is given in a footnote. In a work on "absolute" units, this should hardly occur. The book is indexed very well, which is an additional advantage from the above-mentioned point of view. C. C. G.

*Index-tabellen zum anthropometrischen Gebrauche.* By Carl M. Fürst. (Jena: Gustav Fischer, 1902.) Price 5 marks.

IN the preparation of their great work "Anthropologia Suecica, Beiträge zur Anthropologie der Schweden," Drs. Gustaf Retzius and Carl M. Fürst had to deal with a vast mass of figures. It is the custom of physical anthropologists, not merely to publish their measurements, but also to give the ratio of a given measurement to another, and this is termed an "index"; for example, the ratio of the breadth of the head to its length is called the cephalic index, and is obtained by multiplying the breadth by one hundred and dividing the product by the length. The calculating of a large number of indices is undeniably a very tedious process, and various devices have been employed to save the student this clerical labour. Certain mechanical and other devices have been invented, but these have never proved satisfactory and are not employed by serious workers. The most accurate and practical rapid method of determining an index is by means of

tables which have been carefully computed. It is evident that such tables once constructed and published would materially lighten the labour of those who do this kind of work.

The first tables of this nature were published by Prof. Welcker in the *Archiv für Anthropologie* in 1868. They were calculated only for the cranial index, and even so were not of sufficient range. In 1879, Prof. Flower published some very useful and on the whole accurate tables in his well-known Osteological Catalogue of the Royal College of Surgeons, London, Part i., Man. These were calculated for the various cranial indices which he employed in that valuable publication; though these tables have proved a great boon to workers, they are not sufficiently extensive to meet modern requirements. Of greater scope are the Broca's tables which were published by Bogdanow in the *Mittheil. d. kaiserl. Gesells. d. Naturwiss. anth., eth. Abtheil.* (Moscow, 1879.) These also had some clerical errors, and the size of the page rendered it somewhat unwieldy. This publication was very difficult to obtain, and as a matter of fact the tables were not generally used by anthropologists.

Now all this is changed, as Dr. Fürst has published his extensive tables in a convenient form and at a low price, and has placed at the disposal of his colleagues, in twenty-nine tables, the result of the enormous labour of Fräulein Ellen Anderson-Gulich, who has made the requisite calculations.

Anthropologists will find in these tables practically all the indices they are likely to require, but there are certain indices which have not been carried sufficiently far to include some of the more extreme measurements that can be made on the living subject of non-European peoples; this will affect but few investigators, and that only rarely. Our hearty thanks are due to Dr. Fürst.

*Jahrbuch der Chemie*, 1901. Herausgegeben von Richard Meyer. (Brunswick: F. Vieweg und Sohn.) Price 15 marks.

THE *Jahrbuch* for 1901 is the eleventh of the series and has for its object a review of the chemical work done during the year. Very few alterations are to be noted in comparison with the previous publications so far as arrangement and scope of the work are concerned. Several changes have, however, taken place on the editorial staff. In consequence of the death of Prof. Märcker, the chapters on agricultural chemistry, technology of the carbohydrates and brewing industries have been relegated respectively to Profs. Morgen, Herzfeld and Delbrück. Dr. W. Küster, of Tübingen, is now the editor of the section on physiological chemistry, and Prof. Doeltz, of Clausthal, of that on metallurgy.

The various authors appear to have given, on the whole, a satisfactory account of the research work carried out in their respective provinces, and the reader will obtain a good idea of what has been accomplished during the past year in both pure and applied chemistry. It seems doubtful, however, whether a compilation of this kind, in which nearly all the collaborators are of German nationality, gives the best possible account of the work of men of science in other countries. The greater part of the researches in pure chemistry carried out by English chemists is published in the *Transactions* of the Chemical Society. The editors of the various sections of the *Jahrbuch* apparently consider themselves in many cases capable of giving a clear and succinct account of these investigations by reference to the short notes in the *Proceedings* of the Society. It is unnecessary to point out the impossibility of such a mode of procedure being attended with any measure of success, and the practice must be strongly condemned.

It is to be hoped that, in future publications of the year book, greater care will be exercised in rendering an account of the work of English chemists. Its claims to

furnish a faithful review of the most important research work accomplished during the year can only be justified on that condition.

H. M. D.

*Observations Géologiques sur les Îles Volcaniques explorées par l'Expédition du "Beagle," et Notes sur la Géologie de l'Australie et du Cap de Bonne Esperance.* Par Charles Darwin. Traduit de l'Anglais sur la Troisième Edition par A. F. Renard, Professor à l'Université de Gand. Pp. xxii + 218; 14 figures, one plate. (Paris: Schleicher Frères, 1902.)

THIS volume is the first part of a French translation by Prof. Renard of the geological portion of the "Journal of a Naturalist," which book, as he remarks in his preface, preceded the "Origin of Species" by fifteen years and shows how surely Darwin had laid in his own mind the foundations for the development of that classic work. We should, indeed, have said that the geological observations proved at what a cost to this science the new birth of biology was obtained did we not remember that the idea of evolution has not only reanimated palaeontology, but also has led to a new way of regarding even the inorganic world. Time has not deprived of their value those sections of "Geological Observations" which deal with St. Paul's Rocks, with the fluxional and spherulitic structures in the obsidians of Ascension Island, and with other volcanic islands and the order of eruptive rocks. They, indeed the whole work, can still teach geologists, and not only those who are beginners, the right methods in both observation in the field and the inductive treatment of facts; in a word, how to grapple with new problems. Prof. Renard's intimate knowledge, not only of geology, but also of the English language, so fits him for the work of translation that it is almost needless to say this has been admirably done, and he has added to the value of the volume by including in it the introductory essay which was contributed by Prof. Judd to the volume of the Minerva Library of Famous Books containing Darwin's geological works.

*Galvanic Batteries: their Theory, Construction and Use.* By S. R. Bottone. Pp. xvi + 376. (London: Whittaker and Co., 1902.) Price 5s.

ALTHOUGH the subtitle of this book indicates a comprehensive aim, it is only the construction of primary batteries that receives at all full treatment. In this respect the work is pretty thorough, since the author describes more than 200 different types of cell. The descriptions are short, but are supplemented in many instances by drawings, and should be sufficient to give any reader a clear idea of the essential features of the cell. Data as to the E.M.F., internal resistance and discharge are also given for a fair number of typical batteries. As a handy reference book to which one can turn for information of this sort, this volume should prove very useful, especially, perhaps, to the amateur or to the inventor who is anxious to see if amongst these 200 odd cells there is room for yet one more. From a scientific point of view, the work is disappointing; the tabulation of the different cells is not carried out upon any definite system of classification, so far as we can see, and the theoretical discussion in the first seventy pages is inadequate and unsatisfactory. It is hardly adequate, for example, only to describe the Grotthuss theory (as modified by Clausius) and to speak of this as the "accepted theory of to-day." Again, the fundamental conceptions do not appear to have been clearly grasped by the author, who seems to think that energy and force are the same, and that electricity is a form of energy and may be defined as "a mode of motion in the atoms of bodies." We should not comment upon these errors in a work which is more particularly of a practical character did not the author claim in his preface that "the theory of the battery has been

carefully gone into." Should another edition be called for, we think Mr. Bottone would be well advised to omit the theoretical part altogether and confine himself to the careful tabulation of the cells; the information contained in the descriptive part must have needed considerable pains to collect and can hardly fail to prove useful.

The illustrations are, for the most part, clear; there are one or two minor errors, such, for example, as the misspelling of the names of Sir W. Thomson, Latimer Clark and Grotthuss, which we should like to see corrected.

M. S.

*The Elements of Agricultural Geology: a Scientific Aid to Practical Farming.* By Primrose McConnell, B.Sc. Pp. x + 329. (London: Crosby Lockwood and Son, 1902.) Price 21s. net.

MR. PRIMROSE MCCONNELL is well known as a shrewd writer on practical farming and as one who has done a good deal to bring the facts of science within the reach of the farming community. The present work is on the fascinating subject of agricultural geology. It has evidently been written *con amore*, and we are told in the preface has occupied the author for many years. He treats first of the origin of soils, then follows a chapter on mineralogy, another on physiography and one on water supply. We then come to the most important section of the book, entitled "Formations and Farming," occupying about 110 pages. The volume closes with a section dealing with the evolution of the present breeds of horses, cattle, sheep and pigs.

The most valuable section, and the one containing most original matter, is that relating to formations and farming. We should much like to see this section greatly expanded and its very various subjects treated in full detail, and the whole accompanied by a good geological map of the United Kingdom, which the present volume, notwithstanding its high price, fails to supply. Such a work would be of standard value. Much of the rest of the volume has apparently been compiled from well-known text-books, references to which are freely given.

To the value of the central section we have already referred, but of the book generally we cannot speak so highly. The book has been loosely written, without much attention to scientific exactness, and hasty statements are from time to time made which require at least serious qualification.

The author views the soil as in every case the chief determining factor of agricultural results, whether relating to crops or animals, and a result is said to follow because the soil is Red Sandstone or Mountain Limestone. The considerable influence of varying climate in a country such as our own is seldom taken into account.

*A Teacher's Manual of Geography to accompany Tarr and McMurry's Series of Geographies.* By Charles McMurry, Ph.D. Pp. 107. (New York: The Macmillan Company, 1902.) Price 2s. 6d.

TO teach successfully it is not only necessary for a teacher to have a good knowledge of his subject, but he should also know how best to present its parts to his class, and be familiar, in the case of subjects like geography, with the use to which the common objects of the neighbourhood of the school can be put in rendering lessons clear and interesting. This little book abounds in helpful hints to teachers of geography; it explains how the best results are to be obtained from school excursions, and it should convince the reader that geography is something more than topography, and should be made a means of arousing interest in such subjects as the formation of soils, the cause of scenery, and other changes which are too often ignored in school courses of geography.